TISCIA /SZEGED/ 6, 1970-71

FROM THE LIFE OF THE CO-OPERATIVE

A Conference on the Subject of Tisza-research

According to the decision of the Committee for Tisza-Research, on April 6th, 1970 a research Conference was held. Its aim was to provide opportunity for the investigators functioning in the more remote areas of the country to present the results of their researches and to discuss them, getting on with coordinating the detailed tasks within the scopes of topics of complex character.

At opening the session, Professor Imre H o r v á t h welcomed the present members of the Co-operative and guests, giving the broad outlines of the results achieved in the year before and giving a detailed information on the research activity of the following period. Accordingly, the main purpose of 1971 is the fact-finding biocoenological investigation and fixation of the area of power basin II of the Tisza before the inundation area of largest extension in the Tisza basin will have got to the watery grave. Another task is to study the ecological factors of the fixed areas of biocoenoses indicating the effect of inundation before its taking place, connected with measuring the bio-mass production in some separate cases. He emphasized the importance of functioning of the meteorological stations to be established in the vicinity of the fixed areas for measuring the local climate.

The programme of the Conference was as follows:

1/ D o n á s z y, E.: Complex investigation of developing the fish production.

2/ A n d ó , M.: Natural-geographic conditions of the Tisza-reaches /power basin/ at Kisköre.

3/ U h e r k o v i c h, G.: Sapro-biological conditions of the Tisza and their effect to be expected on river barrage II of the Tisza.

4/ H a m a r, J.: Limnological investigation of the backwaters in the neighbourhood of Tiszafüred.

5/ B o d r o g k ö z y, Gy.: Synecology of the marshland-coenoses of the inundation area in the neighbourhood of Tiszafüred.

6/ T ó t h, M á r i a: Phytocoenoses of the parts of the Maros in Hungary.

7/ G á l, D.: Rhizopod fauna of the Tisza.

8/ B á b a, K. - F e r e n c z, M a g d o l n a: Animal populations of the stone spurs of Tisza.

9/ M a r i á n, M.: Ecological conditions of the sand martin /*Riparia riparia*/ settlements at the Tisza bed.

10/ L e g á n y, A.: Ornithological observations in the inundation area at Tiszafüred-Kisköre.

11/ N e m e s, I.: Experiments for introducing birds in the choice aspen plantations in the inundation area of the Maros.

12/ C s i z m á z i a, Gy.: Mammalogical investigation in the area of river barrage II of the Tisza.

Short abstracts of the lectures and discussion

D o n á s z y, E r n ő:
Complex investigation of developing the fish production /1969-1974/, tasks of the programme in connection with the Tisza research.
The Department for Scientific Research of the Ministry for Agriculture and Food Supply /M.E.M./ gave the Experimental Research Station for Fish-Breeding /Szarvas/ a commission for preparing a five-year research programme, on August 18th 1969.

In the programme, the investigation of the fish fauna of the Tisza-reaches above the river barrage of the Tisza at Kisköre obtained an important role. It is a very considerable duty to design and prepare in the most up-to-date way the formation and piscatorial exploitation of the fish fauna in the ten thousand hectare power basin to be established after building the river barrage.

The following preparatory works are to be performed until 1972:

1/ The composition of the fish fauna between Tiszalök and Kisköre, the alimentary conditions of fish, the factors exerting an influence on their essential conditions, among them the effect of water pollutions and the migratory circumstances of a number of marked fish placed into the Tisza are to be measured.

2/ The establishments needed for developing the fish fauna in the artificial lake of ten-hectare surface are to be designed. Settlements for young-fish breeding and rearing, fisherman's settlements. Also a research basis functioning with a harmonized scope of tasks /is belonging to these, for observing the conditions of the whole area, the development of the fish fauna and for furnishing due informations on data important for the coordinated settlements.

3/ In 1970 a committee is to be brought about for preparing an operative design for arranging fishery in Tisza II. The committee is composed by the fishery co-operatives and other interested institutions and by the representatives of the Research Station for Fish-Breeding, having for task to arrange fishing in Tisza II.

4/ The operative connections between the organs interested in the research work, e.g. the laboratory of the Management of Water Conservancy of the Middle-Tisza-Region, the Tisza-Research Committee in Szolnok and possibly other organs, as well, are to be arranged by Project Collective 1 of the research programme /Breeding Biology - Fishery Biology/.

Contributions to the discussion:

G á l, D.: The decrease of the stock of fish is, at least partly, a consequence of the reduction of the number of spawning-grounds. The fish spawns in the holes of inundation areas. If the developing young fish cannot get back into the Tisza because of the water recedence, it sticks in the hole and after its drying up it perishes. The problem could be solved by establishing suitable connections between the Tisza and the holes.

H o r v á t h, A.: After the Tisza being controlled, its stock of fish has decreased very much. Earlier the fish used to spawn in the warm riparian shallow water of rich vegetation. As a result of the water control flowing has become faster, the water vegetation with flowers disappeared. Then three kinds of possibilities have remained. If in the time of spawning the Tisza does not reach the water holes in the inundation area, spawning fails to come about. If it reaches the holes but recedes comparatively fast, the fish spawns in the hole but the offspring sticks in the hole and perishes. It is rendered possible by the water-level but rarely that the required quantity of young fish could get into the Tisza from the holes of the inundation areas. These holes are small and their number countless. It seems therefore hardly solvable to bring about connections between them and the Tisza for promoting the spawning of fish. It would be a better solution to set up such connections between the backwaters and the Tisza. The stock of fish is, anyway, threatened by the industrial pollution of the Tisza, as well. He raises the question, what the clearing helps against pollutions.

H a m a r, J. answering: According to a new order, the penalty to be paid for pollution is progressive, it may reach the amount of more million forints. As long as there are no suitable purifying plants, the factories are obliged to allot the amount of penalty for creating such plants. To-day it is already disadvantageous from the point of view of the factories to pay penalties instead of creating purifying plants. Nevertheless, suitable purifying plants are still generally missing. In the neighbourhood of Szolnok, for instance, there isn't any such plant functioning in a satisfactory way.

S z i t ó, A.: The siltation of the Tisza-bed is similarly unfavourable for the natural increase of fish. For instance, the multiplication of sturgon is influenced very unfavourably by that. Nonetheless, the purification of rough pollution may be solved.

A n d ó, M i h á l y:

Natural-geographic conditions of the Tisza-reaches /power basin/ at Kisköre

Any up-to-date agricultural production is characterized by its being more and more industrialized. The same holds true also in respect of the economy of water-supplies in connection with agriculture. It cannot be considered as a merely technical activity, being rather an intervention into the water balance of nature and an organic part of the industrial and biological process of agricultural production. The aim of irrigation, inland drainage, complex arrangement of river-basins is equally, to maintain optimum water conditions for the plant cultures by applying jointly the technical, biological, agrotechnical instruments. For increasing the agricultural output, we need the proportional contribution of the areas, as well, where the major improvement of the conditions of production can only be solved by the artificial supply of the missing precipitation.

The middle Tisza-basin and its environment is one of the areas where in the years rich in precipitation and in the humid ages inland water-damages are caused by the abundance in water; in the average of many years, however, the greater lag of crop is caused by the scarcity of water /drought/.

As to the yearly development of the relation between evaporation and precipitation, we have to face a negative water-balance in the mentioned area. On the basis of values of several years, there appears about 150-160 mm yearly scarcity of water. In the average of forty years, in the middle part of the Great Hungarian Plain, the annual precipitation is not more than 300 mm in the growth season. The index of claimed irrigation, that is a quotient of the possible evaporation and of the real mean annual precipitation, is here the highest one as compared to other regions of the country /about seven million cadastral yokes/. The artificial supply of the missing precipitation in the middle part of the Plain is justfied by this fact, as well. We have anyway to provide for water for a major territorial extension of the irrigation. It is important that the water supply for irrigating large areas is available in territories, as well, where the water requirement is even to-day not met by the balance of the need of water and natural water output.

The problem of water supply for irrigating the middle area of the Plain is to be solved by the barrage in the Tisza at Kisköre and its water-basin. The building of the river barrage at Kisköre is a complex establishment of water supplies that is an organic part even of the national blueprint of water management /Tisza-canalization/. Its primary destination is to reduce the water famine that is increasing in the Tisza-basin limiting the development of agriculture; simultaneously, to develop the industry and to meet the water requirement of the settlements along the Tisza.

Contributions to the discussion:

M a r i á n, M. is inquiring for the galery-woods being cleared.

H o r v á t h, A. is asking if the danger of inundation is ceased as a result of river barrages.

A n d ó , M. answering: The water-basin does not cause any rise in the underground water-level, nor any water-fluctuation: the Tisza becomes a river of canal-character. Instead of deforestations there are rather to be expected afforestations, planting of lines of trees against wind.

U h e r k o v i c h, Gábor:

Sapro-biological conditions of the Tisza and their effect to be expected on river barrage II of the Tisza

The Tisza gets to the tarritory of our country in o-ß-mesosaprobic average condition. The first maior population is induced by the Bodrog /cellulose factory at Hencovce/. The next problematical points are the mouth of the Sajó /Ózörény and the industrial area in Borsod/ and the loading by the industrial works at Tiszapalkonya-Szederkény. The third place like these is the joint load of the Zagyva and of the industrial establishments in Szolnok. The fourth place of major loading is Szeged where, in addition on the pollution of the hydrocarbon-field, saprobity is increased first of all by the higher number of the resident inhabitants. /The town sewage-waters are, after the synthetic detergents coming into general use and the households being generally chemicalized, no more so "innocent" ones as before. Similarly, after increasing the chemicalization of agriculture, the saprobic character of the drainage from such an area has changed, as well/.

At the greater loading points mentioned, the total saprobiological picture is temporarily shifting towards the α-mesosaprobic domain. In the intermediary reaches, owing to the suitable activity of self-purification of the river, the ß-mesosaprobic state is again re-established.

The 400 million cubic meter water-basin of the Tisza II barrage that

is to be made will generally be supplied with β-mesosaprobic water /water-quality class II/ by the river. Nevertheless, there will occur some difficulties as to the water quality that are to be reckoned with, from the beginning.

One group of the difficulties - to be discussed in details - is a result of that the limnological development of the pollutions touching the barrage immediately /Sajó, Tiszanalkonya-Szederkény/ will differ from the present ones pouring into a non-impounded reach.

Another group of the difficulties - to be discussed as well in details - will exist only for a transitional one-two years long period, owing to the fact of inundation of the flood area.

A third group of the difficulties will be derived from the fact that the water-basin will be in many places of shallow enough water.

Contributions to the discussion:

H a m a r, J.: asks if the locality of the major polluting effects remains, and if the water-basin is to be expected to be stable.

Z s o l t, J.: establishes that the problems of water pollution have a world-wide interest; the Tisza-investigators had to draw the attention of those competent to deal with them to take these problems more into consideration.

V e t r ó, J.: is mentioning that there are still a lot of problems as to the defence against the pesticides and detergents that are noxious to our health. The Station of Public Hygiene and Epidemics /KOJÁL/ offers aid, resp. co-operation, mainly in bacteriological respect, to the Tisza-investigators, especially in harmonizing their future plans.

B o d r o g k ö z y, Gy.: is suggesting that the results achieved so far by the "KÖJÁL" in connection with the Tisza-research should be published in the Tiscia. He is asking how much time is necessary after a major pollution for re-establishing the state of blance.

U h e r k o v i c h, G., answering: The collaboration in the affairs of water protection ought to be organized in the same way as in Szolnok. In case of the Tisza barrage, the alga-coating of the macrovegetation plays a great part in the self-purification. The effect of the pollution-wave is from time to time the result of time and distance /0.5-5 days/.

H a m a r, J.:

Limnological investigation of the backwaters in the neighbourhood of Tisza-füred

Of the backwaters of middle reaches of the Tisza the different degrees of siltation are characteristic. The siltation of backwaters is influenced by the inundation of the Tisza, by the water vegetation perished in the backwaters, as well, as by the fact that most of them have some independent water areas. Their water is chemically pure, dominated by Ca, Mg, and HCO_3 ions. There is but a small difference between the chemical compositions of the inner /mostly shallow open-water/ regions and the riparian parts of the backwaters. Mainly the values of pH and free CO_2 differ. On the free water surfaces the species characteristic of open waters live /*Ceratium*, *Peridinium*, etc./ Of the alga association the low species number and high individual number is characteristic /Summer data/. There is a complete change in the algological picture in the parts of the backwaters grown in by a floating and submerging water vegetation: *Nymphoidetum peltatae* /A l l o r g e, 1922/, *Trapetum natansis* /M Ü l l e r - G i z s 1960/, *Nymphaeetum albo-luteae* /N o v i n s z k i 1928/. Here predominate *Conjugatae* and *Euglenophytes*, and the high species number and low individual number is characteristic of the

alga association. The algological picture is highly similar to that of marshlands. A similar result was obtained by J. M e g y e r i at investigating the mesozooplankton.

In the riverside reeds /*Scirpeto-Phragmitetum* schoenoplectosum /Soó 1928/ there predominate the perphyte algae, first of all the diatoms.

From among the rare algae there are worth mentioning: *Surirella ovata* var. *pinnata* /W. S m. /, *Synedra arcuatus* var. *subrecta* C l e v e A., *Synedra paracitica* /W. S m ./, *Navicula cuspidata* var. *hankae* f. *craticularis* S k v., found in the so-called long reach /"Hosszu böge" /.

Contributions to the discussion:

B o d r o g k ö z y, Gy. is considering the above address as a good example of that important questions can be met by a reply only after investigating the water biocoenoses not separately.

U h e r k o v i c h, G. is holding as decisive to repeat the investigations. The separation of the main types on the basis of the macrovegetation allows of getting on with dividing the sub-types of microvegetation.

V ö r ö s, L. is taking for necessarily to draw also the groups Cladocera and Copepoda into the investigation.

H a m a r, J., answering: He is proposing the further systematic continuation of investigations /in Winter, as well/.

B o d r o g k ö z y, Gy.:
Synecology of the marshland-coenoses of the inundation area in the neighbourhood of Tiszafüred.

One of the largest and, at the same time, nicest part of the inundation areas along the Tisza is that at Tiszafüred. Its variegated vegetation conditions are brought about first of all by the level differences of the inundation area. The rich long reed-grass vegetation of the backwaters of different ages was reported by me in one of the Tiscia volumes.

Zone of the marshlands following the *Magnocaricion*. The composition of its vegetation is determined by the hydrographical conditions of the inundation area. And that depends, on the other hand, first of all on the flood-waves of the living water in the Tisza, of their frequency and degree. It can be explained by that that the frontier of the single vegetation zones - mainly in the relation of *Magnocaricion* and *Agrostion* - often changes.

Condition of coenoses. The marshland investigated may form even more associations within the *Agrostion* federation. The most frequent one is, anyway, here too - as anywhere else along the Tisza - *Alopecuretum pratensis*. Its differentiation within the association is determined by the peculiar soil and hydrographic factors. Their composition has shown a considerable change even in the course of the investigations carried out for more years.

In the years when the marshlands get inundation water repeatedly in more waves /the most frequently in February, April, and possibly August/, larger fields with stagnant-water become permanent in the inundation areas and the expressedly hygrophilic species predominate and form facies. In these years, the largen extension is achieved by *Alopecuretum pratensis caricetosum gracilis*. Its facies are: *Typha latifolia*, *Gratiola officinalis*. The meadow foxtail /*Alopecurus* sp./ is driven back by these in a high degree. In the years forming a more humid period when the inundation area gets under water usually only in March or April once or possibly on two occasions, and the flood quickly passes, *Alopecurus pratensis* again becomes dominant. Some species of great ecological adaptability - as differential species - are similarly distributed and the subassociation *Alopecuretum pratensis poetosum angustifoliae* becomes dominant, together with

the species *Symphytum officinale, Tragopogon orientale, Trifolium hybridum,* as well as *Gentiana pneumonanthe,* by threads.

The marshlands along the Tisza are rather poor in species in the vicinity of Tiszafüred, as well. That may be explained mainly by the yearly repeated silting up and, as a result of that, by the unfavourable soil-ecological effect of the young pouring soil.

Contributions to the discussion:

A n d ó, M. is asking if the zonality of plant associations as a result of the growing distance from the Tisza can be demonstrated: and what kind of change is caused by the pouring becoming soil.

B o d r o g k ö z y, Gy., answering: There cannot be observed any change as we depart from the Tisza. As the soil formation makes a progress, the associations become richer in species.

T ó t h, M á r i a :

Phytocoenoses of the inundation area of the Maros

Period of the investigation: 1964-1966 /part in Hungary/, 1969 /part in Rumania: Nagylak-Lipova/.

The breadths of bed and inundation area are changing but showing a zonal picture on the basis of the surface, soil and agricultural conditions. That is reflected by the plant associations, as well.

I. Bed-associations /periodical, changing ones/.
II. Associations in the inundation area:
1. Associations with grass included:
Alopecaretum pratensis hung.
Cynodonti-Poëtum angustifoliae
Astragalo-Festucetum sulcatae danubiale
2. Plough-lands, orchards:
Consolido orientali-Stachyetum annuae
Echinochloo-Setarietum
Digitario-Portulacetum
3. Gallery-forests: *Salicetum albae-fragilis*
Fraxino pannonicae-Ulmetum

III. Holes in the inundation area:
Scirpo-Phragmitetum
Polygono-Bolboschoenetum
Bolboschoenetum maritimi continentale

IV. Dams:
1. Lower, wet part: *Alopecuretum pratensis* hung.
2. Middle, drier parts:
Cynodonti-Poëtum angustifoliae

Astragalo-Festucetum sulcatae dimbiale

Arrhenatheretum elatioris /derivative type on the Northern side/

3. Dam crown: *Sclerochloo-Polygonetum*

Lolio-Plantaginetum majoris

Reporting on the most characteristic associations, with special regard to the regularities of the appearance of montan elements.

Contributions to the discussion:

B o d r o g k ö z y Gy., is asking if the performed soil researches concerning the *Polygono-Bolboschoenetum* associations.

U h e r k o v i c h, G. has noticed that the role of the Maros in the species distribution is increased because it is a faster river.

A n d ó, M. has asked if the percentage of the Mediterranean species is higher along the Maros.

T ó t h, Mária, answering, lets known that she had not performed any soil research and has no exact data about the participation of the Mediterranean species.

G á l, DAniel;

Rhizopod fauna of the Tisza reaches in Hungary and of the mouth part of its tributaries

I have collected for the last ten years from the different parts of the Tisza and from the mouth parts of its tributaries 827 plankton, silt, and scrape samples for ascertening how the Rhizopod fauna of the Tisza changes at different places and different dates and how that change is influenced by the tributaries.

The most important results are as follows;

1/ There came to light from the Tisza and its tributaries 69 Rhizopod taxons.

2/ In the planktons *Rotatoria* and *Entomostraca* species predominated.

3/ *Rhizopoda* can be found in the Tisza and its tributaries but with a low number of species and single organisms, the most wide-spread species being; *Arcella rotunda* var. *aplanata* D e f l., *Centropyxis aculeata* S t e i n, and *Cyphoderia margaritacea* E h r b g.

4/ The mouth part of the tributaries is generally poorer in species number, but mostly much richer in the number of single organisms, than the Tisza reaches at the mouth of the tributary.

5/ The tributaries do not exert any well-demonstrable influence on the Rhizopod fauna of the Tisza concerning either the number of species or that of single organisms.

6/ From among the species found, only *Vahlkampfia debilis* J o l l o s is a really river-water species, the others are comsonolite, still-water species of mosses and *Sphagnumdwellers*.

7/ From the Tisza and tributaries I have described a new species: *Euglypha tisciae* G á l.

Contributions to the discussion:

G á l, D.: Abouth the Rhizopod fauna of the Tisza.

H o r v á t h, A. is establishing that, on the basis of the lecture, there manifest themselves remarkable differences between the fauna of the Tisza and that of its tributaries. It would be most desirable to establish the cause of differences.

A n d ó, M. is asking if it is a connection between the faunas of the Kraszna and the marshland at Ecsed.

K i s s, K. is mentioning that in June the *Euriglypha tisciae* was found in the Eastern Main Canal, as well.

M a r i á n, M. is asking if a somewhat more exact quantitative sample collection than that reported on could technically be performed.

S z e m e s, G. is mentioning that the Rhizopod fauna is very important also for qualifying the waters, its investigation being, therefore, absolutely necessary. He is pleased to see the development of the complex character of the Tisza research. He is deeming desirable to develop the complex character of researches and omit any self-centredness in the future, too. The natural history is to be investigated as depending on the water-level, as well. He is congratulating the Co-operative of Tisza Investigation on its results achieved so far.

G á l, D., answering, establishes that it is definitely shown by his investigations that some Rhizopod species do occur only in the tributaries and in the Tisza they can only be seen in the vicinity of the mouth of tributaries. He has studied also the ecology of the single species but his data relating to the subject are not sufficient, as yet, for demonstrating the cause of differences. He has found some differences also between the fauna of the single tributaries. For discovering the possible connections, it is also necessary to investigate the adjacent backwaters and marshlands. At his quantitative investigations he cannot apply larger sample-volumes because of the plankton-net being filled.

B á b a, Károly - F e r e n c z, Magdolna:

Investigations on the riverside stones of the Tisza

The authors were investigating the dependence of construction and localization of the animal coenoses settled on the riverside stones of the river Tisza upon the drift speed /July-August, 1969/. The collections of coenological character were carried out in depths of 10-30 and 50-120 cm, taking into consideration the flow conditions. Our analysed material was deriving from the opposite riversides of the Tisza-reaches of Kisköre, Öhalász, Tiszaörvény at the Middle-Tisza and Vásárosnamény at the Upper-Tisza. The collecting stations were compared with one another on the basis of numbers of the species-dominance-constancy, by applying Ramsey's formula. The results were checked by means of significance reckoning.

Our establishments are: the majority of the 27 species found in the collecting stations of the Middle- and Upper-Tisza have been: *Mollusca, Ephemeroptera, Trichoptera* species. The leading species of the synusia at the Middle-Tisza have been: *Lithoglyphus naticoides, Dreissena polymorpha, Heptagenia sulphurea, H. flava, H. lateralis, Hydropsiche angustipennis, H. instabilis, Cheumatopsiche lepida*! and at the Upper-Tisza: *Caenis lactea* and *Polycentropus flavomaculatus*. Between the coenoses living in the shallower and deeper waters, as well as those of the Middle- and the Upper-Tisza there is no identity of species /B á b a' s publication, 1968/. The synusia found in both water levels vertically differ in species-composition and structure, according to the drift speed. At the riverside sectors of stronger drift, in addition to the constant *Heptagenia sulphurea* and some of the enumerated *Trichoptera* species, there appear the *Theodoxus transversalis, Ecdyonurus venosus, Caenis macrura* species. The losing speed is shown by the appearance of the *Heptagenia flava, H. lateralis* and mullusks as constant species besides the *Triptochera* species, as well as that of *Caenis lactea*. The losing speed leads to an increase of the number of species of high characteristic and that of the total number of single organisms. The synusia in the shallower water at the Middle-Tisza may be contracted into the socion-category *Heptagenia lateralis - Hydropsiche angustipennis*.

Contributions to the discussion:

M ó c z á r, L. is suggesting to get on with collecting the data and to develop the collections more broadly in time. In his opinion, a proper picture of the animal kingdom can only be obtained by systematic collections prolonged to every season. The dynamics of biocoenoses could be investigated in this way, on a pragmatic basis.

H o r v á t h, A. is considering the investigations as promising to be successful. Anyway, there were so far found in the single collecting stations but few single organisms and for a reliable coenological statistics there would be needed several data. He is enumerating some species that - as he knows it from experience - are frequent on the stone dams and were not mentioned in the address. He is asking if they were really missing in the area investigated. He is perticularly wanting the occurrence of *Gammaridae*.

V ö r ö s, L. has noticed the absence of *Grammaridae*, as well. The samples may have been collected possibly in such a way that the *Gammaridae* were omitted.

B á b a, K., answering: The deficiencies mentioned may indicate the pollutions carried by the flood in the Tisza. In the time of investigation they did not find a number of species that had been demonstrated there before. For deciding this problem it is necessary to perform further investigations. In case of these investigations, he suggests, too, to measure the drift speed of the river.

M a r i á n, M i k l ó s :

Econological conditions of the sand martin /*Riparia riparia L.*/ settlements at the Tisza bed

The author outlines his investigations concerning the sand martin, continued by him for six years as the first detailed investigations in that direction in Hungary. Moving on from the mouth of the Tisza towards the river-head, he has carried out so far in 600 river km the quantitativ recording and survey of the colonies. He wants to clarify the dynamics of

population changes in the way of ringing that is being performed more easily than expected before. Last year he began to investigate some colonies ethologically, as well.

Picking out a detail from the results of his ecological investigations, he is demonstrating in which way the formation of the colonies, resp. of the hatching holes within them, is influenced by edafical factors.

In the Tisza bed a precondition of the formation of colonies is a steep river wall without any vegetation. In about 90 per cent of riversides like that the sand martins settle down.

The direction of the site of river walls as compared to the four quaters of the world, in contradistinction to the experiences in case of bird species building their nests in hollows in a tree, does not exert any influence on the settlement of sand martins. The structure of colonies is other one in sandy or loess clay walls than in loess walls.

After digging out and surveying the settlements in details, it can be established that the ducts of the nesting hollows decline from the plane of the front wall, obviously and in the overwhelming majority of cases, in the same angle /65-80 degrees/.

The almost thoroughly staight course of the ducts is similarly striking. Both latter phenomena are explained by the investigator with the peculiarities of the organism of birds, resp. with the technique of hollow-digging.

Contributions to the discussion:

K e v e, A.: In the Tisza-research also an intensive investigation of the avifauna is necessary. That is verified also by the lecture delivered. Although the sand martin does not live in water, owing to its habit of life and the choice of its hatching site it cannot be separated from the natural history of the Tisza. He considers necessary to get on with investigating that topic and is suggesting to extend the bird-ringing observations in as wide limits as possible.

N e m e s, I. is asking, what percentage of the hatching hollows are occupied, what percentage of brood perish,during hatching resp. in what percentage of cases new hatchings take place.

M a r i á n, M. is answering that about fifty per cent of the hatching hollows are dwelt but he has not enough data for establishing the percentage of perished birds.

L e g á n y, András:

Ornithological observations in the inundation area at Tiszafüred-Kisköre

Because of the work of man transforming the nature the interesting fauna and flora of several territories perish. Our task is recording as much as possible of the natural history of these territories still before

these changes will have taken place. The territory demarkated by the line of Tiszafüred-Abádszalók-Kisköre-Poroszló belongs to this category. My aim was to investigate the avifauna. Therefore, I have made recordings according to biotopes - inundation woods, willow-plantations, inland aspen-plantations, choice poplar-plantations, acacia groves, ash-woods, meadows and pastures - by means of which I have endeavoured to clarify the quantitative and qualitative relations of the fauna and, of course, even more for obtaining significant results.

I have established that the area is composed of the mosaics, mosaic complexes of the biotopes. The dominance of xerophilic elements is characteristic, as opposed to the hydrophilic species. The area, being a woodland, is prosperous to the arbicolic species, although the birds hatching in the tree-trunk and shrub stratum are represented, as well, in a considerable percentage.

It is necessary to analyse in details the role of avifauna for clearing up - after investigating the quality of the food used up and reckoning the weight dominance - the very important role played by the birds in maintaining the biological equilibrium and in the biological protection of woods and of the adjacent agrarian areas.

Contributions to the discussion:

B e r e t z k, P.: The coincidence of the crow and heron colonies is here a consequence of the pressure of necessity that is to be explained with the lack of nesting places.

M a r i á n, M. is interested in quantitative data. He is asking if the rooks in the number observed by the speaker can be considered as useful or noxious in the investigated area.

L e g á n y, A., answering: He did not go into the details of more exact quantitative conditions, for lack of time. He is considering the rooks in the area of his investigations as agriculturally noxious in their present number.

N e m e s, István:

Experiments for introducing birds in the choice aspen plantations in the inundation area of the Maros

I have carried out my experiments in two biotopes from 1967 until 1969. The age of trees in both biotopes is 13 - 14 years.

Biotope I: An area surrounded by a Summer dam providing a safe protection even against major inundation of the Maros. It has a stand of tree species that are of second quality from the point of view of forestry, weak and badly developed. The extent of wood area is 1 x 1 km.

Biotope II: Generally inundated area. An excellently developed, dense, narrow tape-wood, with thin insect population on the ground level.

My experiments have been carried out with standard holes made of wood and asbestos slate /types A,B,C,D/.

In the course of my experiments so far six bird species settled down: *Parus major* L., *Parus caeruleus* L., *Passer montanus* /L/, *Junx torquilla* L., *Sturnus vulgaris* L., *Phonicurus phoenicurus* /L./.

The most important influencing factor of the bird establishments is the river Maros.

In the first year of my investigations the inundation area of the Maros, except biotope I, was covered with a very high flood, until the end of May. Then I observed here the establishment of highest proportion, in respect both of the number of species and that of single birds. Anyway, also the successful nesting was disturbed the most, just in that time, by the struggle for hollows and by Mustela n.nivalis. In the following years the adjacent area was not inundated by the Maros therefore, owing to the more and more enriched insect population, the number of nesting species decreased, as well.

Biotope II, except *Junx torquilla*/L./ and *Phoenicurus phoenicurus* /L./, has similarly proved to be suitable for bird establishment.

Contributions to the discussion:

C s i z m a z i a, Gy. is asking if the author has observed any harm by mammals and bat-establishment in the artificial holes.

B o d r o g k ö z y, Gy. is asking if the occupation of the holes by sparrows could be prevented by making hole-apertures of smaller diameter.

N e m e s, I., answering: He has observed neither any dammage by mammals nor the establishment of bats. In the area investigated by him there are not living any mammals /e.g.,red squirrels/ that were harmful from this point of view. We have to promote the rapid breeding of useful birds by means of artificial holes. He is admitting, to be sure, that the occupation of holes by sparrows makes difficulties.

C s i z m a z i a, György:

Mammalogical investigation in the area of river barrage of the Tisza

The investigations were carried out in the area of Pusztataksony, Kisköre /1962/63/, in the inundation area of Kisköre, Sarud /1965/, in that of Abádszalók and Poroszló /1968/, as well as in the vicinity of Tiszafüred /1969/.

In the course of comparing the data of trappings to the hydrographical conditions it turned out that the life of mammals living in the inundation area and the regeneration starting from the back areas are decisively influenced by the height and duration of inundation waves. B a u e r /1956/ and F e s t e t i c s /1959/ described the fluctuation of the population of 6-7 years old small mammals in case of "population minimum" if connected with a great inundation wave. In that case, the regeneration of mammals in the inundation area takes only place in the following year /1962/. After inundation waves of average size in the inundation area between Kisköre and Tiszafüred, at the end of July, - in the course of migration - the mammalian fauna showed a complete picture again.

During the collections, observations there lived 25 mammalian species in the area.

H y d r o b i o n t i c group: *Lutra lutra, Ondatra zibethica, Neomys fodiens.*

H y d r o p h i l i c group: *Sus scrofa, Talpa europaea, Sorex araneus, Sorex minutus, Crocidura leucodon, Micromys minutus, Rattus norvegicus.*

H y d r o g r a d e group: *Vulpes vulpes, Mustela nivalia, Mustela erminea, Mustela putorius Martes foina, Capreolus capreolus, Lepus europaeus, Apodemus agrarius, Apodemus sylvaticus, Apodemus flavicollis, Mus musculus, Microtus arvalis, Erinaceus europaeus.*

X e r o p h i l i c group: *Citellus citellus, Spalax leucodon.*

After the barrage being finished, only the existence of mammalian species belonging to the Hydrobiontic group is guaranted, and even we may reckon with their rapid breeding.

At the building operations in progress at present, a great number of fossil mammal finds have been found but a part of them gets lost.

While so far the life of animals living in the area has been influenced the most decisively by the inundation waves, at present the human work /wood-felling and cutting, soil-work, etc./ results similarly in a strong transformation of the mammalian fauna /transmigration of the deer, hare removal of the ondatra settlements to other places, increase of the number of otters, etc./.

At present, quantitative and qualitative picture of the mammalian fauna of the area is changing from year to year and this process will last until the storing lake will have been completely filled up.

Contributions to the discussion:

U h e r k o v i c h, A. is suggesting to take into consideration the weather at setting the traps in their places.

H o r v á t h, A. is thinking that at evaluating the results of trappings we need some care. The mammal may not have fallen into a trap, only because it did not go to that place or had found the required food somewher else. In casts, the author himself found some species that he had not entrapped. The shrew-hunting by a tree with tinder fungus might have been more successful because the shrews had come to eat the insects living in the fungus. It is no sufficient evidence of the perdition of mammals in the inundation area that the traps placed to the riverside had remained empty. They may have escaped swimming and got the bank somewhere else. An animal making its escape from a sudden inundation is strongly under the influence of the instinct of flight; it is questionable whether or not it eats on that occasion.

G á l, D. is thinking that investigating the effect of inundation we ought to study, apart from the fate of the single species, also that of the populations.

B á b a, K. is raising the idea of labelling the small mammals.

M a r i á n, M. is mentioning his exnerience that the small mammals are not induced to a quick escape by a slow increase of water level; on that occasion there could be obtained proper data by trapping. He is asking the speaker if he trapped *Spalax hungaricus* in the area at Kisköre.

C s i z m a z i a, Gy. is answering that the result of trapping has not been influenced by weather in a decisive way. Feed can be observed even during escaping. He is dealing with the plan of labelling the small mammals. As to *Spalax hungaricus*, he could observe only its characteristic canal.

H o r v á t h, I.: Chairman's concluding words:

He is considering the Conference as a successful recording of their work, as to the number of participants and speakers, the intensive contributions and their content. He is asking to continue the enthusiastic work. They are going to discuss the plans of work in the meeting of the Committee for Tisza-Research before long, and forward the requests about the possible changes to the members. Moreover, he is asking to concentrate the investigations of that year are planned for the end of July in the sector of the Tisza II barrage. For the Committee for Tisza-Research a motor-boat is being made and is expected to be finished for that date. He is asking the researchers to use as exact methods as possible and to apply generally accepted methods in their fields of research.